fishes, but it differs from all of these in the long crown without distinction of root, and in the thick cement investment.

Char. specif. Crown elongate, curved transversely to the long diameter of the grinding face. The latter is a little narrower than a semicircle, and the internal half of it consists of cementum. The dentinal plates form two cutting edges which are separated by a shallow valley of soft dentine. The two edges of dense dentine are in contact at one end of the grinding face, but leave an interval at the other, and both extremities of the external and shorter ridge are folded inwards, forming two loops. External face flat and smooth. Other surfaces also smooth. Length of tooth minus root, on external curve, 14 mm.; long diameter of grinding surface, 7 mm.; short do., 4 mm.; long diameter at broken base, 4 mm. I propose for the name of this species, *Tomiopsis ferruminatus.*

This animal left its remains in a bed of probably Neocene age, which is exposed on the Lapara creek in Western Texas. It was associated with scales of Lepidosteus, and bones of Trionyx and a tooth of a crocodile, which do not furnish an exact clue to the age of the formation. The specimens were obtained by Dr. E. T. Dumble, Director of the Geological Survey of Texas, and submitted to me for determination.

The Conservation of Osmazome in Roasting.

By Mr. R. Meade Bache.

(*Read before the American Philosophical Society, November 17, 1893.*)

Time was, and not so very long ago, when I should have hesitated about touching in this hall upon any subject related to cookery, despite the fact that we are by the Constitution of our Society devoted to the promotion of useful knowledge. But now, when the art of cooking seems to be beginning to receive some general recognition in this country, and is rising in some small measure to the dignity of a science, through expert articles in magazines and through departments of special schools, I need no longer fear that even here gastronomical discussion allied to dietetic good might fall upon unwilling ears.

In the days when I was a mighty hunter before the Lord, before I ceased to take satisfaction in killing for pleasure, when I shot deer on the mountain side, once at a safe distance at a retreating grizzly bear, and on another even followed a she one and two cubs towards their lair, without finding it, to which gracious dispensation I doubtless owe the honor of addressing this meeting of the Society, I made a casual observation in the pure air of the mountains whenever I came to cook an evening meal of venison. This was, of the exceedingly large development of osmazome on the roast. Reflection I did not at that time make on the subject. The

simple fact was then observed unreflectingly, to be later collated with other observed facts, from which in sum I drew the conclusion to which this paper points. Intermediately I learned (chiefly through Brillat Savarin's famous work on the physiology of taste) of the great gustatory value of osmazome as a culinary product, but without reference to its dietetic value. This, perhaps, it was that prompted me mentally to revert to my former mountain experiences, when I had seen osmazome developed to the highest degree of excellence that I have ever met, and thereupon other facts connected with the roasting and baking of meat fell into line, leading to the conclusion to which I have referred.

These facts resolved themselves finally into two coördinated ones, open to the observation of any one who has lived in a time which combined roasting meat with the Dutch-oven (sometimes called the tin-kitchen) and baking it in the ordinary household oven. We may observe in the three methods of cooking mentioned, that in the open air, that in the Dutch-oven, and that in the ordinary oven, two steps of degradation. What, then, makes the difference in their products, when the substances submitted to the heat, being essentially the same, can possess no difference in heat-ray selective capacity? It seems to me, obviously, to be caused by the diminution, in two of these processes, of the presence of pure air; that is to say, the deficiency of oxygen, with sufficient aqueous vapor, in association with these processes. Oxygen seems to me, for two reasons, to be the prime factor in the best effect, because that effect seems analogous to other effects in the presence of oxygen, and because nitrogen is recognized as a very inert gas. I do not believe that the effect would be produced at all in a vacuum. Stated in final terms, the perfect development of osmazome in roasting depends, in my view, upon the roast's being immersed in a copious and ever-changing bath of pure air, causing what may be termed oxygenation of the meat.

With the Dutch-oven, the air bath is copious and changing, but it is derived from the kitchen, full of effete matter in suspension, and in a measure deoxygenated by breathing, and sometimes by artificial lights. With the ordinary oven, the same objectionable conditions, in lesser degree, attend the process of baking meat, but their diminution is more than compensated by the circumstance that all the waste products are for the most part confined within the narrow limits of the oven, and the juices of the meat evaporate, on account of the lack of moisture in the deficiency of aqueous vapor in the air. Hence we have, to take the extreme case, the average farm meat-product of the oven, with the osmazome of the exterior utterly destroyed in a black crisp, and even with the Dutch-oven, unless with ceaseless basting, a product far inferior to that of the Homeric method.

I need not pause to descant upon the value of osmazome as a constituent of meat, to be developed, not to be destroyed or impaired by the process of cooking. You are all aware that it consists of various principles, found sometimes even in vegetable substance, combined with empyreumatic pro-

ducts, and is, in sum, most succulent and wholesome for the gourmet, besides being excellent dietetically for the sick and convalescent.

Having had, through my particular course of life, an exceptionally good opportunity of seeing the average mode of cooking in the land, I can say without hesitation that I do not upon reflection consider my conviction at all exaggerated, when I state that its general cooking of meat, as being innutritious and wasteful, is barbarous, and for this reason I once bethought me of making a small contribution to the sum of knowledge of better things. With the conviction of which I speak in my mind, I thought, a few years ago, in 1887, to aid in the improvement of the art of cooking, at least among the well educated, whence the knowledge might spread, by devising an oven which should approximate in its function to the task of yielding the osmazome which a given piece of meat is capable of producing, in nearly the most perfect form of which the piece is susceptible. We must remember that we do not create osmazome by any process, and that its manifestation on the outer layers of meat subjected to the roasting or baking process does not represent all the osmazome in the piece, but merely that portion which has submitted to what Savarin aptly calls caramelization. Nevertheless, the proper caramelization on a piece of roasted meat is the outward sign of an inward grace. If the piece has been countrified, the outer layers are charred and the interior dried by long continued evaporation of the juices of the meat. If the piece is represented by the opposite extreme of treatment, the outside has never been allowed to become so hardened as to present a serious barrier to the penetration of heat to the interior ; the outside is sapid, though crisp, and the interior shaded off from the outside by insensible gradations of rareness ; the flavor of the whole surviving in the so-called juice, containing the active principles, osmazome and other extractives, that give delicious flavor. But the ordinary oven is not an instrument capable of effecting this result to a high degree ; no existing oven is. Well adapted as the oven is to the drying of dough incidentally to the baking of bread, cake and pies, it is for that very reason, besides others, the poorest possible instrument in its present form wherewith to attempt to imitate a roast.

I fully realized that the course of cookery could not be turned backward in a land where the frying-pan still wields the sceptre against the invasion of the gridiron. I accordingly applied for a patent for an oven which depends upon the simple device of allowing a controllable stream of air, as pure as procurable, to pass through it while the process of cooking is proceeding. For the first time, however, in applying for a patent, I failed to obtain one. The objection made to my device by the patent examiner to whom it was, in the course of routine, submitted, was that it had been anticipated by some one who had invented a wire-gauze door for an oven. I have not, however, changed my opinion that the device does not conflict in the slightest degree with the other invention cited as preventing its acceptance. There are examiners and examiners, and some are not infallible, as I found out many years ago, when, having incidentally used, as a

detail to the production of a new thing, an article that happened to be in the market, an examiner decided against allowing a patent, upon the ground that the man who had invented the incidentally used article had invented it for all the possible uses to which it might in the future be applied ; an untenable proposition, easily disposed of upon appeal, by an argument that I made, supported, as witnesses, by Prof. Joseph Henry, Dr. Henry Morton, Mr. J. E. Hilgard, and General Meade.

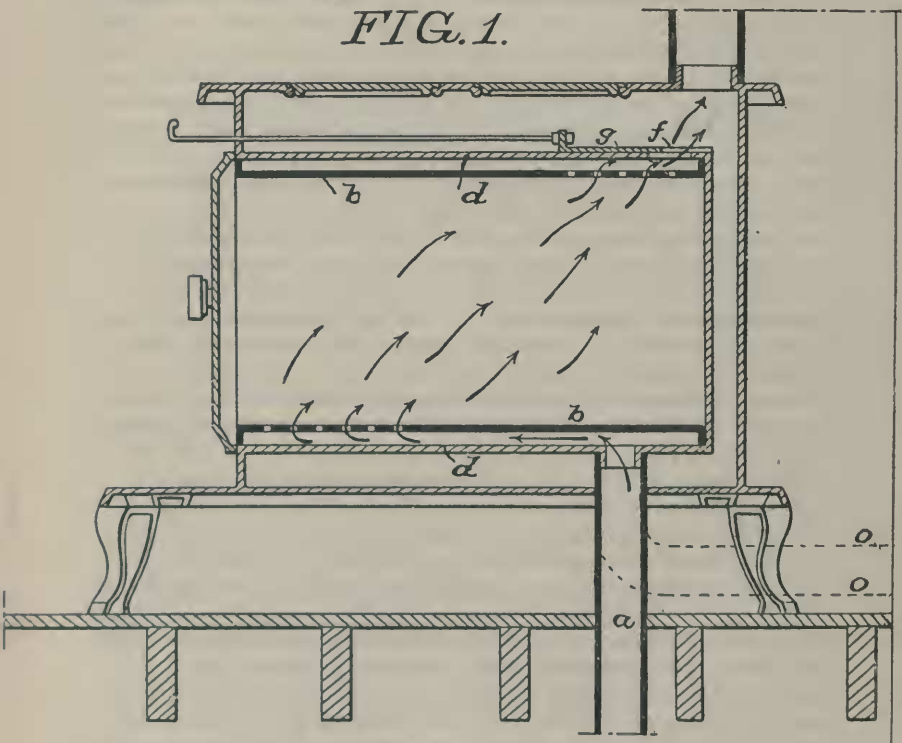
The validity of patentable invention depends upon two factors, the realization of an idea as embodied in an original apparatus. Thousands of men since Dædalus have conceived of the practicability in various manners of aërial navigation under the open skies, but the embodiment of the idea still remains undemonstrated. The person who invented the gauze-wire door for an oven certainly thereby made a step in advance towards culinary aëration of the oven for meat, and therefore a step in the right direction towards the oxygenation of it, whatever may have been his intention with reference to the result observable. But, even conceding his full intention in that regard, and the incontestability of the result, the apparatus is still a most imperfect one for securing the desirable end, so remote from anything but embryonic function, that it may justly be regarded as simply tentative in the right direction. When, moreover, we additionally consider that patents issue under the characterization of "improvements" in some designated category, containing thereby the implication that there can be no absolutely new invention, it is impossible to see why the apparatus which I submitted to the Patent Office of the United States does not at least come under the designation of an improvement on the gauze-wire door oven, of which my patent agents knew before they entered my application for a ventilated oven (the records always being consulted previously), and therefore could not have thought barred my claim.

If we are to concede that exposing the interior of an oven more or less to circumambient air, of whatever quality, and dependent for its movement solely upon radiation, then any one who ever purposely left an oven door ajar while meat was cooking in it, made to the wire-gauze door an approximate invention. Everything leaks to air and water. If the adoption of either method constitutes oxygenation of an interior, in the sense in which it is here used, then it follows that every natural and artificial cavity on earth can be deemed aërated, even the receiver of an air-pump, except one where there is no untraversed space in the cylinder, secured by surrounding the piston by mercury, as in the air-pump of Kravogl. Aërated and oxygenated, in a certain narrow sense, the oven with the gauze-wire door may certainly be considered to be, but in the true sense, which I had in view in my device, it cannot be considered effective. Such an oven receives from the kitchen all the effete products floating in the air. Its change of air, such as it is in amount, whatever it may be in quality, is only owing to the erratic flux and reflux primarily set up by radiation from the mouth of the oven. On the contrary, the device which I presented for the purpose defined admits the purest outdoor air at com-

mand, the flow of which is compelled to pass continuously around the meat in process of cooking, perfectly controlled by a simple and a single damper, the waste products being liberated into the chimney.

I will anticipate being ask why, if this be so, I have not prosecuted my claim by renewal of it. I reply that it is my intention to take that course when I have time. I still hope to give the first examiner, if he has survived the precariousness of office, or if not, his successor, an opportunity of enlightenment through further demonstration, and of change of mind as to the possibility of a claim to the invention of an oven, characterized by

FIG. 1.



the purity and the regular flow of its air, being invalidated by the previous invention of an oven with a gauze-wire door. If an examiner, whoever he may be, is not open to conviction on a point, then the appeal of a case to the Board of Examiners of the Patent Office is always open to the applicant.

The two diagrams on the blackboard represent the very simple device by which the object that I proposed to myself can be accomplished.

Figure 1 represents a longitudinal section of a modified cooking-stove, illustrating the device.

A pipe (*a*) is carried down from the oven of a modified cooking stove, through the floor, and into the cellar beneath the room in which the stove is situated; or where, because of the impurity of the air of the cellar, this plan is not available, the pipe (*a*) may be deflected, as shown by the dotted lines (*o*), and led to the open air through the walls of the room, or in any other convenient manner. In order that the air may be properly diffused and caused to circulate effectively, flanged plates (*b*) are fastened at top and bottom of the oven, between each of which plates and the oven-casing is enclosed a chamber (*d*). The bottom plate, it will be observed, is perforated at and near the front of the oven, and the top plate perforated at and near the rear, and in the top of the oven-casing (*f*) a discharge opening is formed, communicating with the chimney flue, the effective area of this opening being governed by means of the common form of sliding damper (*g*).

It will be seen that thus the volume of cool, pure air, entering the lower chamber (*d*), passes thence to the front, and then escapes into the oven through the perforations of the lower (*b*) plate, there taking the course of diffusion indicated by the direction of the arrows, until it finally escapes from the oven through the perforations in the upper (*b*) plate. It is evident that the perforations in the two plates may be so located as to compel the air to take any course desired through the oven.

It will be observed that, although the flow of air is, for convenience, represented by the diagram as taking place within a somewhat determinate line, yet that, in point of fact, the air entering the oven will, on account of its immediate and great increase of volume, expand into every part of the oven, and its consequent flow towards the upper vent will be from all lateral and inferior directions.

Figure 2 represents a modification of the device illustrated in Figure 1.

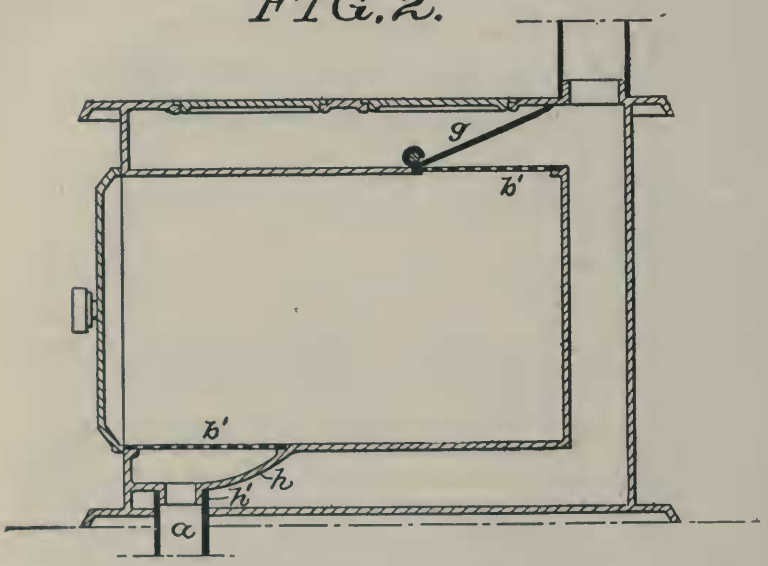
In this case the bottom plate of a cooking-range oven is cast, technically "dished," with a depression (*h*) near the front end. Both dish and opening are covered by perforated plates (b^1). The dish (*h*) has a neck (h^1), to which is adapted a fresh-air supply-pipe (*a*), and in the upper flue of the range is located a hinged damper (g'), turned from the outside by a crank handle, by which the flow of air from the oven into the chimney-flue through the upper perforated plate may be governed.

If it be sought to approach or to rival the excellence of roasting, through the instrumentality of a ventilated oven, five conditions must be fulfilled. The air supplied to the oven must be pure, plentiful, continuous, well-distributed, and regulatable.

The movement of all air, whether free on the surface of the earth, confined in houses, or occupying lesser space, being dependent upon differences of density in different parts, and these differences of density being in turn dependent upon differences in the relative temperature of those parts, purity of air for a ventilated oven may be secured with all the other conditions as concomitants.

The source of supply may be through a conduit from the open air, or through one leading from a properly cemented and sanitarily kept cellar, the terminal of the conduit in either place being covered with metallic gauze to exclude dust. The air of a dwelling-house cellar should be as pure as that of the rest of the house. Hence it is a mistake in a furnace-heated house to draw for the air-chamber of the furnace, directly from outdoors, most of its supply. In a cellar properly regulated in every particular, the air from the furnace should be drawn from outdoors, mostly, if not entirely, through the intermediation of the cellar, thus searching and keeping sanitarily sweet its inmost recesses.

FIG. 2.



Rapidity of movement of the air for the oven, dependent upon differences of density, being secured by constituting either outdoors or the cellar the source of supply, ample amount of it is thereby necessarily involved. The ability to secure purity for this air being naturally associated with the means adopted to obtain ample movement, involving amount, it remains only to remark that continuity of the movement of the air is necessarily a concomitant of the other conditions, and to consider lastly the points of its regulation and distribution. The first of these ends is secured by the construction of the apparatus described, and the second by the employment of the single damper, as represented in the diagrams exhibited.

Whether the air, after having passed through the oven, shall be dis-

charged outdoors or into the chimney may be determined by household construction. That it should not be allowed to carry its effluvia into the kitchen is certain. Owing to the position in which cooking ranges are usually placed, it would, as a general rule, be most convenient for the air to find its way into a flue to the chimney. But its finding exit there has no especial advantage, physically speaking, over the other mode of exit, for the movement of air at any season of the year, dependent upon the differences of density between the air outdoors and that in the oven, would always afford superabundant volume, to be regulated by the damper, without adding to its updraught the great radiation up the chimney.

I have heretofore confined myself, as in duty bound, to the elucidation of the theme represented by the title of my paper. But it should not be inferred from my omitting discussion of anything beyond it, that I limit the good effect of the presence of ample oxygen in cooking to the preparation of meat for the table. On the contrary, I believe, as the result of observation, not experiment, that some vegetables, and therefore, I conclude, all, are so affected, and cook better in free air than elsewhere. In a qualified sense observation, however, is experiment, where work is done to the hand of one who has not opportunity to do it for himself, but seizes it in observing effects casually offered by that of others, and then combines the facts in conclusions.

A Vocabulary of the Nanticoke Dialect.

By Daniel G. Brinton, M. D.

(*Read before the American Philosophical Society, Nov. 3, 1893.*)

Among the valuable MSS. in the library of the American Philosophical Society is one, now a little over one hundred years old, which contains the only known vocabulary of any length of the Nanticoke dialect or language, once spoken in Maryland, on what is called the "Eastern shore," the region between Chesapeake bay and the Atlantic. Several requests have reached me from time to time to prepare this vocabulary for publication, and it seems to be a duty which the Society owes the republic of letters to make it available for purposes of study and comparison.

The vocabulary was collected at the request of a former President of this Society and of our country, Mr. Thomas Jefferson, by Mr. William Vans Murray, from an old woman called Mrs.